$2\sec^2(x^7)$

$x^3\sin^2(5x)$

$\cos^3\left(\frac{x}{x+1}\right)$

$\sqrt{x}\tan^3(\sqrt{x})$

$\sqrt{\cos(5x)}$

$x^5\sec\left(\frac{1}{x}\right)$

$\sqrt{3x-\sin^2(4x)}$

$\frac{\sin x}{\sec(3x+1)}$

$[x+\csc(x^3+3)]^{-3}$

$\cos(\cos x)$

$[x^4-\sec(4x^2-2)]^{-4}$

$\sin(\tan(3x))$

$y=x\cos(3x)$

$\sin(1+x^3)$

$\sec^3\left(\frac{\pi}{2}-x\right)$

$\left(x-\frac{1}{x}\right)^3$

$$\sqrt{3x-\sin^2(4x)} = (3x-\sin^2(4x))^{1/2}$$

$$\Rightarrow \frac{1}{2}(3x-\sin^2(4x))^{-1/2}(3-8\sin(4x)\cos(4x))$$

$$\frac{d}{dx}f(g(x)) = f'(g(x))\cdot g'(x)$$

First: $x \to 4x \to \sin(4x) \to (\sin(4x))^2 \to 3x-(\sin(4x))^2 \to (\ )^{1/2}$

$$\frac{d}{dx}\sin^2(4x) =$$

$$\frac{d}{dx}(\sin(4x))^2$$

$$= 2(\sin(4x))(\cos(4x))(4)$$

$\frac{d}{dx}(\ )^2$ $\quad \frac{d}{dx}\sin(\ )$ $\quad \frac{d}{dx}(4x)$

$\frac{d}{dx}\left(2\sec^2(x^7)\right)$

where do I start?

Chain $2\left[(\sec(x^7))^2\right]$

$x \to x^7 \to \sec x^7 \to (\sec x^7)^2$

$\frac{d}{dx}(x^2) = 2x$

$\frac{d}{dx}(\sec x) = \sec x \tan x$

$2\left[2(\sec(x^7))\,\sec(x^7)\tan(x^7)(7x^6)\right]$

product $(2)\left(\sec^2(x^7)\right) \Rightarrow 0(\sec^2(x^7)) + 2\left(\frac{d}{dx}\sec^2(x^7)\right)$

$= 2\frac{d}{dx}\left(\sec^2(x^7)\right)$

$2\left[\underbrace{(\sec(x^7))}_{f}\underbrace{(\sec(x^7))}_{g}\right] * \quad \frac{d}{dx}(f)\cdot g + f\frac{d}{dx}(g)$

$\frac{d}{dx}(\sec(x^7)) = \sec(x^7)\tan(x^7)(7x^6) *$

$x \to x^7 \to \sec(x^7)$

$* 2\left[\underbrace{7x^6\sec(x^7)\tan(x^7)}\left[\sec(x^7)\right] + \left[\sec(x^7)\right]\left[7x^6\sec(x^7)\tan(x^7)\right]\right]$

$2\cdot 2\cdot 7x^6\sec^2(x^7)\tan(x^7)$

$\frac{d}{dx}(\sec(x)) = \sec x \tan x$

$\frac{d}{dx}(\sec(x^7)) = \sec(x^7)\tan(x^7)(7x^6)$

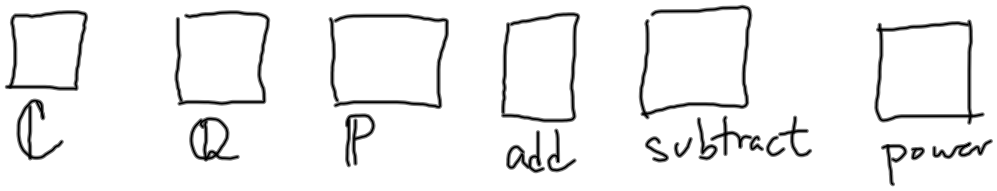
$\frac{d}{dx}(\sec(\cos x)) = \sec(\cos x)\tan(\cos x)(-\sin x)$

$\frac{d}{dx}(\sec(\cos(x^7))) = \sec(\cos(x^7))\tan(\cos(x^7))(-\sin(x^7))(7x^6)$

power rule

$2\cdot\sec^2(x^7)$

$= 2\left[\sec(x^7)\right]^2$



ℂ = you need to use chain rule

ℚ = " " " " quotient rule

ℙ = " " " " product rule

⋮

$2\sec^2(x^7)$

$\cos^3\left(\frac{x}{x+1}\right)$

$\sqrt{\cos(5x)}$

$\sqrt{3x-\sin^2(4x)}$

$[x+\csc(x^3+3)]^{-3}$

$[x^4-\sec(4x^2-2)]^{-4}$

$y=x\cos(3x)$

$\sec^3\left(\frac{\pi}{2}-x\right)$

$x^3\sin^2(5x)$

$\sqrt{x}\tan^3(\sqrt{x})$

$x^5\sec\left(\frac{1}{x}\right)$

$\frac{\sin x}{\sec(3x+1)}$

$\cos(\cos x)$

$\sin(\tan(3x))$

$\sin(1+x^3)$

$\left(x-\frac{1}{x}\right)^3$

$$\sec\left[\left(\frac{\pi}{2}-x\right)^3\right]$$

$$\left(\sec\left(\frac{\pi}{2}-x\right)\right)^3$$

$$3\left(\sec\left(\frac{\pi}{2}-x\right)\right)^2\left(\sec\left(\frac{\pi}{2}-x\right)\right)$$

$$\left(\tan\left(\frac{\pi}{2}-x\right)\right)(-1)$$

$$\left(x-\frac{1}{x}\right)^3$$

$$\left(x-x^{-1}\right)^3$$

$$3\left(x-x^{-1}\right)^2\left(1-(-x^{-2})\right)$$

$$3\left(x-x^{-1}\right)^2\left(1+x^{-2}\right)$$

$(\cos(\cos x))$ $\quad$ $(x^5)(\sec(\frac{1}{x}))$

$\cos(\cos x)$

$x \to \cos x \to \cos(\cos x)$

$\frac{d}{dx} = -\sin(\cos x)(-\sin x)$

$= \sin(\cos x)\sin(x)$

$(x^5)\left(\sec\left(\frac{1}{x}\right)\right)$

$\frac{d}{dx}(h) = \frac{d}{dx}(x^5)\cdot\left(\sec\left(\frac{1}{x}\right)\right) + (x^5)\frac{d}{dx}\left(\sec\left(\frac{1}{x}\right)\right)$

$= (5x^4)\left(\sec\left(\frac{1}{x}\right)\right) + (x^5)(\quad)$

$\frac{d}{dx}\left(\frac{1}{x}\right)\frac{d}{dx}(x^{-1}) = -x^{-2}$

$\frac{d}{dx}\left(\sec\left(\frac{1}{x}\right)\right) = \sec\left(\frac{1}{x}\right)\tan\left(\frac{1}{x}\right)\left(-\frac{1}{x^2}\right)$

$\frac{d}{dx}(\sec x) = (\sec x)(\tan x)$

$= \frac{\sin x}{\cos^2 x}$

$\frac{d}{dx}\left[x^4 - \sec(4x^2-2)\right]^{-4}$

Where do I start?

Chain

Power Rule $\frac{d}{dx}(x^{-4}) = -4x^{-5}$

$\left[x^4 - \sec(4x^2-2)\right]^{-4}$

$-4\left[x^4 - \sec(4x^2-2)\right]^{-5} \cdot$

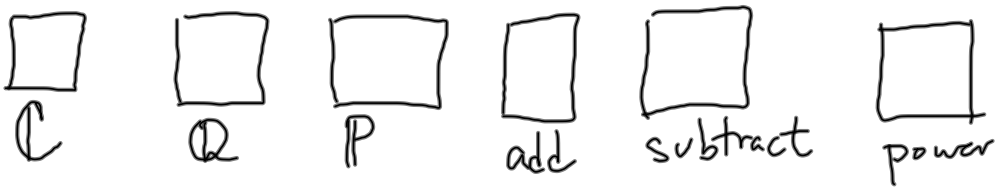
$\left(4x^3 - \sec(4x^2-2)\tan(4x^2-2)(8x)\right)$

$\frac{d}{dx}\left(x^4 - \sec(4x^2-2)\right) = 4x^3 -$

$\frac{d}{dx}\left(\sec(4x^2-2)\right) \cdot \left(\sec(4x^2-2)\tan(4x^2-2)\right)\left(8x\right)$

$\frac{d}{dx}(\sec x) = \sec x \tan x$

Subtract



C = you need to use chain rule

Q = " " " " quotient rule

P = " " " " product rule